

## CLAIMS

We claim:

- 5 1. A biochip cartridge comprising:
  - a) a nucleic acid amplification chamber comprising:
    - i) an inlet port
    - ii) an outlet port comprising a valve to control the exit of amplification reaction mixture;
  - and,
  - 10 b) a pump.
2. A biochip cartridge as in claim 1 further comprising a heater.
3. A biochip cartridge as in claim 1 further comprising a detection chamber comprising a substrate an array of electrodes, each comprising:
  - 15 i) a self-assembled monolayer;
  - ii) a capture binding ligand; and,interconnects to allow the electrical connection of said electrodes to a processor.
4. A biochip cartridge as in claim 1 wherein said reaction mixture is PCR amplicon.
- 20 5. A biochip cartridge as in claim 1 wherein said reaction mixture is the product of an isothermal nucleic acid amplification reaction.
6. A biochip cartridge as in claim 5 wherein said amplification reaction is selected from the group consisting of NASBA, SDA, RCA, and TMA.
- 25 7. A biochip cartridge according to claim 1 wherein said valve is a check valve.
8. A check valve according to claim 2 wherein said check valve is a duck bill valve.
- 30 9. A check valve according to claim 2 wherein said check valve is a cantilever valve.
10. A biochip cartridge according to claim 1 wherein said valve is a burst valve.

11. A biochip cartridge according to claim 1 wherein said pump is an air pump.

12 A biochip comprising:

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- a) one or more resistive heaters;
- b) a thermal conductive layer;
- c) a printed circuit board; and,
- d) a layer of solder mask.